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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/352,976	07/14/1999	MICHAEL D. GILBERT	00169-027001	2851

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EXAMINER	
CHANG, VICTOR S	

ART UNIT	PAPER NUMBER
1771	

DATE MAILED: 08/11/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/352,976	GILBERT, MICHAEL D.	
	Examiner	Art Unit	
	Victor S. Chang	1771	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 May 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,4-6,8,9,14-26,28-30,32 and 66-81* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,4-6,8,9,14-26,28-30,32 and 66-81* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. In view of the Appeal Brief filed on 5/26/2006, PROSECUTION IS HEREBY REOPENED. A new ground of rejection is set forth below.

To avoid abandonment of the application, appellant must exercise one of the following two options:

(1) file a reply under 37 CFR 1.111 (if this Office action is non-final) or a reply under 37 CFR 1.113 (if this Office action is final); or,

(2) initiate a new appeal by filing a notice of appeal under 37 CFR 41.31 followed by an appeal brief under 37 CFR 41.37. The previously paid notice of appeal fee and appeal brief fee can be applied to the new appeal. If, however, the appeal fees set forth in 37 CFR 41.20 have been increased since they were previously paid, then appellant must pay the difference between the increased fees and the amount previously paid.

A Supervisory Patent Examiner (SPE) has approved of reopening prosecution by signing below.

2. Upon a careful review, it is determined that the allowable subject matter in Office action mailed 1/31/2006 is a new matter, therefore the indicated allowance must be withdrawn. The purpose of the present reopening of prosecution is mainly to correct the new matter issue.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it

pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claim 81 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim contains a subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Specifically, upon reconsideration, it is determined that since claim 81, added in an amendment filed 12/15/2005, recites a range "the polymer constitutes at least 75% by weight" not present in the original disclosure, therefore it is a new matter. Although applicant has pointed to Example 1 as a support (Remark 12/15/2005 page 7), and the examiner has calculated that the polymer content in Example 1 is about 78 wt% (a single data point), nonetheless Example 1 lacks a showing of the claimed range, nor has the examiner found such a range been expressly or inherently disclosed in the specification.

Rejections Based on Prior Art

5. Claims 1, 5, 6, 8, 9, 14-22, 25, 28, 29 and 68-80 are rejected under 35 U.S.C. 102(b) as being anticipated by Moulton et al. (US 5441830), and evidenced by Koga (US 5565284).

Moulton's invention relates an electrochemical cell. Moulton teaches that it is known art that a current collector is attached (adhered) to a cathode or an anode (electrode) in an electrochemical cell to collect current. Typical current collector is a metal foil or a conductive plastic foil (col. 1, lines 35-42). Composite cathodes are well known in the art. For example, a composite cathode can comprise a cathodic material, an electrolytic solvent (electrolyte), an alkali salt, a solid matrix forming polymer. Composite anodes are also well known in the art.

For example, a composite anode can comprise an anodic material, an electrolytic solvent, and a matrix forming polymer (col. 8, lines 10-21). Moulton discloses a method for enhancing the adhesion of a composite electrode to a conductive foil by coating the current collector foil with an adhesion-promoter, which retards the contact of the electrolytic solvent in the composite electrode with the current collector (col. 2, lines 20-35). In other words, absence of the adhesion-promoter coating, the electrolyte in the composite electrode is in contact with the current collector.

For claims 1, 19 and 20, the well known art of composite electrode, electrolyte solvent, matrix forming polymer, and current collector foil, taught by Moulton, reads on the disbondable composition, electrolyte functionality, matrix functionality, and electrically conductive surface of the instant invention, respectively. Moulton's teaching of a need to enhance the adhesion between composite electrode and conductive foil infers that the adhesion (bonding) is disbondable. Moulton is silent about how a faradaic reaction weakens the bond (adhesion) between the composite electrode and current collector foil. However, since the well known electrochemical cell taught by Moulton has the same structure and chemistry as claimed, and Moulton also teaches that in the absence of an adhesion-promoter, the electrolyte in the composite electrode is in contact with the current collector, the bond weakening faradaic reaction at the interface, is considered to be inherently present, as evidenced by the Koga reference. Specifically, Koga's invention relates to an electrochemical cell. Koga teaches that when an electrode is formed on a current collector, repetition of charge-discharge cycles exacerbates (weakens) the interfacial adhesion (bonding) between the current collector and the electrode, caused by the expansion and contraction during doping and dedoping of the active material upon

charging and discharging (i.e., electrochemical or faradaic reactions; see specification page 4, lines 18-19, which defines "faradaic reaction" as "electrochemical reactions in which a material is oxidized or reduced"), which creates defects (debonding) at the electrode-current collector interface; and by the decomposition of the polymer binder by oxidation and reduction (electrochemical or faradaic reactions) upon charging and discharging (col. 1, lines 39-60). It should be noted that a sufficient amount of electrolyte is inherently present at the electrode-current collector interface for the above-mentioned reactions, because an ionic conductive electrolyte is necessarily required for carrying out the electrochemical or faradaic reactions.

For claims 5, 6, 8, 9 and 14-16, Moulton teaches that the cathode paste can optionally contain film forming agents such as polypropylene oxide, which reads on the recited alkoxy moieties (col. 12, lines 36-44). Moulton teaches that suitable electrolytic solvents include propylene carbonate, ethylene carbonate (alkyl carbonates), glyme (alkoxide), etc. (col. 7, lines 33-35). Moulton also teaches that suitable cathode prepolymers are metal ion conducting, such as propylene oxide, ethylene oxide, epichlorohydrin (epoxies), acrylol-derivatized polyethylene oxide, urethane acrylates, vinyl sulfonate polyalkylene oxides, etc. (col. 5, line 59 through col. 6, line 5; col. 12, lines 26-35). Among the exemplary prepolymers, the vinyl sulfonate polyalkylene oxides comprises both a non-polar component (polyalkylene oxide segment) and an ionic conductive component (vinyl sulfonate segment). Further, the polyalkylene oxide non-polar component also reads on the instantly claimed alkoxy moieties. As to the recited localized phases of regions of substantially matrix functionality and substantially electrolyte functionality, since the prior known art employs the same matrix forming polymers and electrolytes as

claimed, and the compatiblility among materials is an inherent material property, these compatibility related regions are also reasonably considered as being inherent.

For claims 17, 18 and 21, since applicant either failed to traverse the Examiner's assertion of official notice, or the traverse was inadequate (see Office action mailed 2/28/2003, pages 4-5; and Office action mailed 7/22/2004, page 5), these limitations have been taken as admitted prior art.

For claim 22, Moulton teaches in Example 7 that the cathode powder is prepared by combining V_6O_{13} and carbon powder, and V_6O_{13} is prepared by heating ammonium metavanadate ($NH_4^+VO_3^-$), i.e., an ammonium salt, (col. 18, lines 57-61).

For claim 25, Moulton shows in Example 7 a cathode paste composition comprising an inhibitor (col. 19, line 32-33).

For claim 26, Moulton teaches that the composite electrode in an electrochemical cell of prior known art is adhered to current collector foil, therefore the composite electrode composition functions as an adhesive to the foil.

For claim 28, Moulton teaches that the electrode is applied by coating method (col. 13, lines 19-23).

For claim 29, absence of a standard of what constitutes "resistant to delamination", the prior art reads on the instant invention as claimed.

For claim 68, the composite electrode and conducting foil in an electrochemical cell are inherently connected to separate conducting poles (a positive pole and a negative pole), and supports an electrochemical (faradaic) reaction at the bond between the composite electrode and current collector upon charging-discharging cycles, as evidenced by Koga.

For claims 69-79, since the claimed limitations essentially duplicate the same scope of the preceding claims, they are also rejected as set forth above.

For claim 80, Moulton teaches a layer of electrically-conducting adhesion promoter comprising a polymeric matrix of from about 20 to about 70 weight percent of a polymer derived from solid matrix forming monomer or partial polymer thereof (col. 3, lines 24-29; lines 39-43 and 64; col. 4, line 6). It should be noted that while Moulton teaches that the adhesion promoter retards the contact of electrolyte to the current collector, it does not exclude the presence of electrolyte at interface. In other words, the claimed invention does not preclude the teaching of Moulton.

6. Claims 4, 23, 24, 30, 32, 66 and 67 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Moulton et al. (US 5441830), and evidenced by Koga (US 5565284).

The teachings of Moulton are again relied upon as set forth above.

For claim 4, Moulton teaches that conventional curing or crosslinking is used for forming a solid electrode (col. 13, lines 29-38). Although Moulton is silent about crosslinking densities in different regions, however, since Moulton teaches that prior art has substantially the same structure and composition as set forth above, the crosslinking densities in different regions are reasonably considered as being either inherent due to the compatibility of materials in the composite composition, or an obvious optimization to one skilled in the art of composite electrode, motivated by the desire to provide suitable improved mechanical strength and retain good conductivity in regions of different functionalities, within the context under 35 USC 103(a).

For claims 23 and 24, Moulton is silent about the ionic conductivity of the composite electrode. However, since Moulton teaches that prior art has substantially the same structure and composition as claimed, a suitable ionic conductivity is also reasonably considered as either being inherent to the same composition as claimed, or an obvious optimization to one skilled in the art of composite electrodes, motivated by the desire to obtain a good electrical current, within the context under 35 USC 103(a).

For claims 30, 32, 66 and 67, Moulton is silent about the shear strength of the adhesive bond. However, since Mouton teaches that prior art has substantially the same structure and composition as claimed, and Moulton also teaches that an enhanced adhesion is desired, a suitable shear adhesion strength is reasonably considered as either anticipated by known prior art with selecting suitable materials for the composite electrode, or an obvious optimization to one skilled in the art of electrochemical cells, motivation by the desire to obtain a durable adhesion between the electrode and current collector.

Response to Argument

7. Applicant argues (Remarks pages 4-7) that the examiner offers no evidence that the composition of Moulton supports a faradaic reaction, and improperly infers this feature from an "implicit" teaching of Moulton and some passages from Koga, because the examiner does not purport to locate the critical feature in the express teaching of Moulton or Koga. In particular, applicant argue that the claims of instant invention recite a composition that enables a faradaic reaction so as to allow the compostion to disbond, but there is nothing in Moulton that even hints at this possibility. However, the evidence provided by Koga clearly teaches that upon charging

and discharging, ionic electrochemical (faradaic) reactions causes bonding defects and decomposition of polymer binder at the interface, which exacerbates (weakens) the adhesion (disbond) between the composite electrode and current collector foil.

Applicant argues (Remarks pages 7-) that the claims of present invention cover compositions with specific electrical properties (disbanding by a faradaic reaction) that are lacking in Moulton's composition, because the composite electrodes taught by Moulton are conductors, and the faradaic reaction required by the present claims cannot by supported by an electronic conductor. However, Moulton teaches that the composite electrodes comprise cathodic or anodic materials for the electrochemical reactions to generate current, i.e., they are not merely electronic conductors.

Finally, applicant argues (Remarks pages 8-9) that the examiner ignores key limitations in the claims, which require enablement or support of a faradaic reaction at the adhesive bond to an electrically conducting surface. However, clear evidence has been provided by the Koga reference, which points out the weakening (disbonding) at the adhesive bond are caused by electrochemical or faradaic reactions.

Applicant's arguments to the contrary are not persuasive.

Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Victor S. Chang whose telephone number is 571-272-1474. The examiner can normally be reached on 8:30 - 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Terrel H. Morris can be reached on 571-272-1478. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Victor S Chang
Examiner
Art Unit 1771

7/21/06

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